Aquarius Level-3 Standard Mapped Image Products

1.0 Introduction

This document describes the specifications of Aquarius Level-3 mapped archive products that are produced and distributed by the NASA Goddard Space Flight Center's Aquarius Data Processing System (ODPS). The products are implemented in the Hierarchical Data Format (HDF5), and HDF5 terminology is used in this document.

These specifications are given in terms of the logical implementation of the products in HDF5 and are not a physical description of file contents. HDF5 software must be used to create or read these products.

The Level-3 standard mapped image (SMI) products are image representations of binned data products generated from Aquarius data. The data object, **l3m_data**, in each SMI product represents an image of the parameter specified by the global attribute **Parameter**. This object is a two-dimensional array of an Equidistant Cylindrical (also known as Platte Carre) projection of the globe. The values can be stored as bytes, 2-byte integers, or 4-byte floats. The first two are scaled real values and may be converted to geophysical values using the global attributes **Scaling**, **Scaling Equation**, **Slope**, and **Intercept**.

The standard SMI products are generated from binned data products of Sea Surface Salinity (SSS). Thus, each SMI product represents data binned over the period covered by the parent product. The mean is used in each case to obtain the values for the SMI grid points from the binned data products. Each SMI product contains one image of global SSS and is stored in one physical HDF5 file. There will be two types of products generated for each period: a simple mean of the computed SSS from the Level-2 inputs, and an optimally interpolated global salinity fields. The type is indicated in the global attribute **Measure**.

2.0 Naming Convention

The form of a Level-3 SMI file name is Qyyyysss_eee.L3M_SSS, where Q is for Aquarius, yyyy is the year, sss is the start day of the period, and eee is the end day of the period. The standard Level-3 file period is one calendar month.

A sample file name is: Q2004319_346.L3M_SSS

3.0 Global Attributes

For global attributes that have constant values specific to this product type, the value is given.

3.1 Mission and Documentation

This section lists common attributes for all sensors, followed by sensor-specific attributes.

Product Name (character): the name of the product file (without path).

Title (character): "Aquarius Level-3 Standard Mapped Image".

Sensor Name (character): "Aquarius".

Product Type (character): "month", "seasonal" or "year".

Replacement Flag (character): "ORIGINAL" if this is the first version of this product delivered to the DAAC; otherwise, it is set to the name of the product to be replaced (superseded) by the present product.

Software Name (character): "l3map"; name of the software used to create this product.

Software Version (character): version of the software used to create this product.

Processing Time (character): local time of generation of this product; concatenated digits for year, day-of-year, hours, minutes, seconds, and fraction of seconds in the format of YYYYDDDHHMMSSFFF.

Processing Control (character): path and name of the file containing the control parameters. This information is stored in the product as part of its processing history.

Input Parameters (character): all input and processing control parameters used by the calling program to generate the product. Vertical bars or carriage return characters serve as parameter information delimiters. This information is stored in the product as part of its processing history.

Input Files (character): the name of the Level-3 binned data product (main file name without path) from which the current product was created. This information is stored in the product as part of its processing history.

L2 Flag Names (character): same as for parent Level-3 binned product.

3.2 Data Time

Period Start Year (2-byte integer): binning period start year (cf. **Start Year**) of parent product.

Period Start Day (2-byte integer): UTC day-of-year of start of binning period (cf. **Start Day**) of the parent product.

Period End Year (2-byte integer): binning period end year (cf. **End Year**) of the parent product.

Period End Day (2-byte integer): UTC day-of-year of end of binning period (cf. **End Day**) of the parent product.

Start Time (character): data start UTC as read from the parent product; concatenated digits for year, day-of-year, hours, minutes, seconds, and fraction of seconds in the format of YYYYDDDHHMMSSFFF.

End Time (character): data end UTC as read from parent product; concatenated digits for year, day-of-year, hours, minutes, seconds, and fraction of seconds in the format of YYYYDDDHHMMSSFFF.

Start Year (2-byte integer): UTC year of data start from parent product.

Start Day (2-byte integer): UTC day-of-year of data start from parent product.

Start Millisec (4-byte integer): UTC milliseconds-of-day of data start from parent product.

End Year (2-byte integer): UTC year of data end from parent product.

End Day (2-byte integer): UTC day-of-year of data end from parent product.

End Millisec (4-byte integer): UTC milliseconds-of-day of data end from parent product.

3.3 Scene Coordinates

Map Projection (character): "Equidistant Cylindrical".

Latitude Units (character): "degrees North"; units used for all latitude values in this product.

Longitude Units (character): "degrees East"; units used for all longitude values in this product.

Northernmost Latitude (4-byte real): 90.0.

Southernmost Latitude (4-byte real): -90.0.

Westernmost Longitude (4-byte real): -180.0.

Easternmost Longitude (4-byte real): 180.0.

Latitude Step (4-byte real): latitudinal distance between lines (180./**Number of Lines**).

Longitude Step (4-byte real): longitudinal distance between columns (360./**Number of Columns**).

SW Point Latitude (4-byte real): latitude of data point for southwesternmost grid cell to indicate location of data center within each grid cell; equals **Southernmost Latitude** + (**Latitude Step**/2.0).

SW Point Longitude (4-byte real): longitude of data point for southwesternmost grid cell to

indicate location of data center within each grid cell; equals **Westernmost Longitude** + (**Longitude Step**/2.0).

3.4 Data Description

Data Bins (4-byte integer): number of bins containing data in the parent product.

Number of Lines (4-byte integer): number of points in the vertical (longitudinal) direction.

Number of Columns (4-byte integer): number of points in the horizontal (latitudinal) direction.

Parameter (character): “Sea Surface Salinity”

Measure (character): "Mean" or “Optimally Interpolated”.

Units (character): "PSU”.

Scaling (character): "linear"

Scaling Equation (character): "(Slope*l3m_data) + Intercept = Parameter value".

Slope (4-byte real): used to convert the values of **l3m_data** into geophysical values by (**Slope***l3m_data**) + **Intercept**.

Intercept (4-byte real): used to convert the values of **l3m_data** into geophysical values by (**Slope***l3m_data**) + **Intercept**.

Data Minimum (4-byte real): minimum value of the input data used to generate **l3m_data**.

Data Maximum (4-byte real): maximum value of the input data used to generate **l3m_data**.

Scaled Data Minimum (4-byte real): minimum value allowed by **Slope** and **Intercept**.

Scaled Data Maximum (4-byte real): maximum value allowed by **Slope** and **Intercept**.

4.0 Data Arrays

l3m_data (byte, 2-byte integer or 4-byte float, array size **Number of Lines** x **Number of Columns**): array of **Parameter** data; may be converted into real values using **Slope** and **Intercept**. A **l3m_data** value of 255 (byte), 65535 (integer) or 0.0 (float) is reserved to indicate "no data"; i.e., a bin for this geographic location does not exist in the parent Level-3 binned product.